The number of gallons of water in a tank $t$ minutes after the tank has started to drain is $Q(t) = 200(30 - t)^2$.

1. (a) What is the average rate at which the water flows out during the first ten minutes?
   (b) during the five minutes from $t = 5$ to $t = 10$?
   (c) during the two minutes from $t = 8$ to $t = 10$?
   (d) during the minute from $t = 9$ to $t = 10$?

2. Estimate how fast the water is running out of the tank at the end of ten minutes.

3. Draw a graph of the function $Q$ for $0 \leq t \leq 20$. Draw the secant lines for the four time intervals used in part a). What are their slopes?